UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/622,931	11/13/2000	Yoshiki Nakagawa	1581/00210	5489

7590 07/22/2003

Burton A Amernick
Pollock Vande Sande & Amernick
PO Box 19088
Washington, DC 20036-3425

EXAMINER	
ZALUKAEVA, TATYANA	

ART UNIT	PAPER NUMBER
1713	17

DATE MAILED: 07/22/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

A 5/7

Office Action Summary	Application No.	Applicant(s)	
	09/622,931	NAKAGAWA ET AL.	
	Examin r	Art Unit	
	Tatyana Zalukaeva	1713	

-- The MAILING DATE of this c mmunication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 May 2003* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6 and 8-34* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6, 8-34* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 10.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

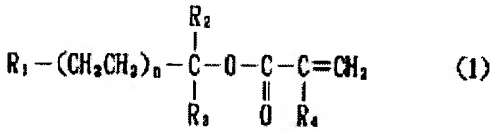
DETAILED ACTION

1. Claim 1 has been amended in Paper No.9 to include the limitations of the process by which the claimed product is obtained, thus transforming a claim to the product to a product-by-process claim.

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 1-3, 15, 16 and 17 are rejected under 35 U.S.C. 102(b) as anticipated by **or, in the alternative, under 35 U.S.C. 103(a) as obvious over JP 06329720**.

JP'720 discloses a new high-purity polyethylene macromonomer **obtained by living polymerization**, which has a **terminal (meth)acryloyl** group and can be copolymerized with another vinyl monomer to give a comb-type graft polymer suitable as a polymer blend compatibilizer, a **surface modifier, etc.** Polyethylene macromonomer is provided of the formula



(1)

wherein R1 is a 1-6C linear or branched saturated hydrocarbon group; R2 and R3 are each H or a 1-18C aliphatic or aromatic hydrocarbon group provided R1, R2, and R3 are the same or different from each other; R4 is H or methyl; and n is an integer of 10-1,000). In JP'720 n (which is a degree of polymerization) ranging from 1-10,000.

4. Claims 1-3, 13, 15-29, 22, 28 and 29 are rejected under 35 U.S.C. 102(b) as being anticipated or in the alternative as obvious over U.S. 5,242,983 to Kennedy et al.

Kennedy discloses a polymeric composition comprising living polymer of methyl methacrylate copolymerized with **tris(omega.-methacryloyl) polyisobutylene**. A powder is formed from the composition, and the final cement is prepared by mixing the powder with additional methyl methacrylate in the presence of a catalyst to form a dough-like material that is polymerized in situ to yield a cement useful for orthopedic purposes (see abstract).

It has been shown by Kennedy that the molecular weight of the **methacryloyl telechelic polyisobutylenes** should be controlled within particular limits if optimal physical properties between about 6,000 to about 25,000 grams per gram mole (col. 5, lines 20-26)

In addition, it is necessary that the molecular weight distribution of the acryloyl telechelic polyisoibutylene, be maintained within auniform range. M.w /Mn, of these compounds does not exceed 1.5, preferably from about 1.2 to about 1.3 (col. 5, lines 28-54).

In preparing a composition of a polymethyl methacrylate with telechelic polyisobutylene Kennedy utilizes N,N-dimethyl p-toluidine as an accelerator, hydroquinone as a stabilizer and benzoyl peroxide as a polymerization catalyst. (col.7, lines 40-45 and Table 1).

With specific regard to claim 13 Kennedy discloses a methodology of preparation of a telechelic polymer, by first preparing a polyisobvutylene, (col. 9, lines 30-47), then functionalizing the said polymer to obtain a hydroxyterminated polyisobutylene, which is in details described in col. 10, lines 25-60, and further reacting such hydroxyterminated polyisobutylene with methacryloyl chloride (col. 10, lines 63-68, col. 11, lines 1-16) to obtain a methacryloyl terminated polyisobutylene.

5. Claims 1-6, 11, 13-20, 22, 23, and 34 stand rejected under 35 U.S.C. 102(b) as being anticipated by or in the alternative over Randen et al (U.S. 5,604,268) .

Randen discloses an adhesive composition comprising functionally reactive macromers, which are prepared from the corresponding **telechelic prepolymers** of, for example, octadecyl acrylate (ODA), behenyl acrylate (BeA) and mixtures of tetradecyl acrylate (TDA), and a variety of other acrylates and acrylic esters, all prepared by living polymerization. (col. 5, lines 46-55).

Macromers with calculated molecular weights of 2500, 5000, 11,000 and 20,000 g/mole for ODA and macromers of BeA with calculated molecular weights of 4500 and 11,000 have been prepared (col. 5, lines 58-65). The hydroxyterminated telechelic polymers were then functonalized with acryloyl chloride(ACl), methacryloyl chloride(MACl), 2'-isocyanatoethyl methacrylate(IEM), 3-isopropenyl-alpha, alpha-dimethylbenzyl isocyanate(IPDMBI) and the like. (col. 13, lines 1-14)

Example 23a in Table 3 demonstrated the preparation of an ODA hydroxy-terminated, telechelic prepolymer with a calculated molecular weight of approximately 11,000, wherein mercaptoethanol (col. 13, line 21) is used as a chain transfer agent.

Other ODA hydroxy-terminated telechelic prepolymers with calculated molecular weights of approximately 2500, 5000, 7500 and 20,000 g/mole were prepared in the same manner and are shown in Table 3, Examples 20, 21, 22 and 28 respectively. Examples 23c through 27 demonstrated telechelic polymers with varying amounts of ODA homopolymer therein.

As noted above the claims are product-by-process claims, and in terms of the PRODUCT, the references meet the limitations of the instantly amended claims.

Each one of the cited references discloses an acryloyl group end-functional or telechelic vinyl polymers, and provide different chemical reactions describing functionalization of polymers in order to achieve the desired end-functionality. With regard to claim 12 there is no evidence, or no reason to believe that the process of functionalization as instantly claimed in claim 12 produces a different product, that of reaction of JP'720, Kennedy and Randen, consult ***In re Thorpe***, 227 USPQ 964 (CAFC 1985).

With regard to the references that do not elucidate the exact process by which the polymer was robtained, it is noted that because of the nature of product-by process claims, the Examiner cannot ordinary focus on the precise difference between the

claimed product and the disclosed product. It is then Applicants' burden to prove that an unobvious difference exists. See ***In re Marosi***, 218 USPQ 289, 292-293 (CAFC 1983).

In the instant case no Graham vs. John Deere analysis was made but rather the test set out in MPEP 706.03(e) and In re Marosi was applied while explaining why the claimed product does not patentably distinguish over the prior art under 35 USC 102/103.

See also footnote 11 O.G. Notice 1162 59-61, wherein a 35 USC 102/103 rejection is authorized in the case of product-by-process claims because the exact identity of the claimed product or the prior art product cannot be determined by the Examiner.

6. Claims 6, 8-10, 21, 30-33 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Matyaszewski (U.S. 5,807,937) alone or over JP'720 in combination with Matyaszewski.

JP'720 discloses JP'720 discloses a new high-purity polyethylene macromonomer which has a **terminal (meth)acryloyl** group prepared by **living anionic polymerization.**

Howver, JP'720 does not elucidate the specific type of living polymerization, namely atom transfer radical polymerization with the use of specific transitional metal complexes, nor does it specify the aqueous emulsion as a composition containing such polymers.

Matyaszewski discloses a method of atom transfer radical polymerization (ATRP), as a kind of a living polymerization process in particular application to the process of making end functional and telechelic polymers (see abstract, figure 1, col.25, lines 31-35, col. 26, lines 5-56, etc.) Matyaszewski discloses a variety of suitable polymers, including acrylates, methacrylates, styrene and other vinyl polymers, terminated by a variety of functional groups, including acryloyl groups, as can be derived from the meaning of X explained through the whole body of a patent). The range of molecular weights and molecular weight distributions of Matyaszewski's end-functional and telechelic polymers are within the instantly claimed range (see, for example col. 26, lines 44-56)..Metal complex catalyst utilized by Matyaszewski is preferably a copper complex. The end functionality of the copolymers of Matyaszewski an be easily converted to other functional groups, including acryloyl groups by any conventional and known methods (col. 39, lines15-25). Polymers can be prepared using water as a medium, utilizing an emulsion polymerization (col. 39, lines 43, 44).

Since both Matyaszewski and JP'720 teach the living radical polymerization of vinyl compounds terminated by acryloyl groups, and since Matyaszewski provides detailed description and mechanism of ATRP, one skilled in the art would have found it obvious to utilize the specificities of Matyaszewski in a living process of JP'720 in order to achieve the advantages of ATRP, such as controllable molecular weight and narrow molecular weigh distribution.

7. Claims 19, 24-32 stand rejected under 35 U.S.C. 103(a) as being unpatentable over any one of JP'720, Kennedy, Randen or Matyaszewski (each one individually) in view of Fifield (U.S. 5,381,735).

.JP '720, Kennedy, Randen and Matyaszewski all disclose acryloyl group end functional vinyl polymers, which are components for curable compositions. However, the above references do not specify photocuring by means of actinic rays or photopolymerization initiators.

Actinic radiation and photoinitiators are well known to those skilled in the art for curing polymeric compositions.

Thus Fifield discloses photopolymerizable composition comprises a photopolymerizable material having ethylenically unsaturated bonds available for participation in addition (free radical) polymerization. Prepolymers, of Fifield are those having olefinic bonds at the **termini** of the chain are subsequently further polymerized by use of **actinic radiation**. (col.4, lines 24-35)

The termini of the prepolymer chain are typically **"capped" via an ester** or carbamoyl (urethane) linkage with an olefinic moiety such as an acrylate or methacrylate. (col. 4, lines 43-46). The composition can be also thermally cured with the use of thermal initiators (col. 7, lines 45-50).

Since JP'720, Kennedy, Randen or Matyaszewski suggest curing or crosslinking a composition comprising a polymer having terminal functional group, and Fifield specifies the details of curing process for the similar compositions one skilled in the art would have reasonably expect that the conventionally known techniques of

photopolymerization are operable within the scope of JP'720, Kennedy, Randen or Matyaszewski inventions with the reasonable expectation of success.

Therefore, the combination of references renders the above claims prima facie obvious and properly rejected under 35 USC 103(a).

Response to Arguments

8. Applicant's arguments filed May 15, 2003 have been fully considered but they are not persuasive. Applicants only presented arguments for the rejection based on JP'720 reference. These arguments are addressed below.

The ***crux*** of Applicants' arguments with regard to JP'720 is that the living anionic polymerization is disclosed vs. living radical polymerization as per instant claims. In response to this, it is noted that the rejection under 35 USC 102/103 of the product-by-process is affirmed by the courts, as per ***In re Brown***, 173 USPQ 685 (CCPA 1972), wherein the Court of Customs and Patent Appeals (CCPA) explicitly approved the 102/103 rejection of a product-by-process claim over a reference which showed a product **which appeared to be identical** or only slightly different from the claimed product. Because of the nature of product-by process claims, the Examiner cannot ordinarly focus on the precise difference between the claimed product and the disclosed product. It is then Applicants' burden to prove that an unobvious difference exists. See ***In re Marosi***, 218 USPQ 289, 292-293 (CAFC 1983).

See also footnote 11 O.G. Notice 1162 59-61, wherein a 35 USC 102/103 rejection is authorized in the case of product-by-process claims because the exact identity of the claimed product or the prior art product cannot be determined by the Examiner. ***In re Thorpe***, 227 USPQ 964 (CAFC 1985) the Examiner rejected product-by-process claims over a product, which although **prepared in a different manner**, appeared to be the same (prima facie) as the claimed product. In the instant case Applicants did not show how the **claimed product** is different from the product of the applied prior art.

In response to Applicants' statement that JP'720 fails to anticipate the instant claims and citation of case laws that each and every recitation as set forth in the claims should be disclosed by the reference, it is noted that JP'720 does anticipate each and every limitation of the instant claims **in terms of a product** .

The same rationale applies to all other references that show identical or even slightly different product, even obtained by another polymerization process.

With regard to the Matyaszewski reference the process of making a variety of polymers identical to the instantly claimed process having a genus of end functional groups. The reference to Matyaszewski was used to show how the functionasl end group of EP'720 fits in the polymers obtained by the process of Matyaszewski.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tatyana Zalukaeva whose telephone number is (703) 308-8819. The examiner can normally be reached on 9:00 - 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu can be reached on (703) 308-2450. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0651.

Tatyana Zalukaeva, Ph.D.
Primary Examiner
Art Unit 1713

July 15, 2003